भारतीय मानक ब्यूरो
BUREAU OF INDIAN STANDARDS
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG, NEW DELHI 110002

व्यापक परिचालन मसौदा

हमारा संदर्भः सीईडी 44/टी-5 **07 अक्टूबर 2024**

तकनीकी समिति : सिविल इंजीनियरिंग के कार्यों के मापन की पद्धतियाँ (जल संसाधन विकास को छोड़कर) विषय समिति, सीईडी - 44

प्राप्तकर्ता :

क) सिविल इंजीनियरी विभाग परिषद्, सीईडीसी के सभी सदस्य
ख) सीईडी 44 व उसकी उपसमितियों, के सभी सदस्य
ग) रूचि रखने वाले अन्य निकाय

प्रिय महोदय/महोदया,

निम्नलिखित भारतीय मानक का मसौदा संलग्न हैं:

प्रलेख संख्या	शीर्षक
सीईडी 44 (26226)WC	**भवन की माप की विधि एवं सिविल इंजीनियरिंग कार्य भाग 5 फॉर्मवर्क** [IS 1200 (भाग 5) का *पांचवां पुनरीक्षण*] ICS 17.020; 91.040.01; 93.010

कृपया इस मानक के मसौदे का अवलोकन करें और अपनी सम्मतियॉ यह बताते हुए भेजे कि यदि यह मानक के रूप में प्रकाशित हो तो इस पर अमल करने में आपके व्यवसाय अथवा कारोबार में क्या कठिनाइयाँ आ सकती हैं ।

सम्मतियाँ भेजने की अंतिम तिथि : **06 नवंबर 2024**

सम्मति यदि कोई हो तो कृपया अधोहस्ताक्षरी को उपरिलिखित पते पर संलग्न फोर्मेट में भेजें या divya.s@bis.gov.in पर ईमेल कर दें ।

यदि कोई सम्मति प्राप्त नही होती है अथवा सम्मति में केवल भाषा सम्बन्धी त्रुटि हुई तो उपरोक्त प्रलेख को यथावत अंतिम रूप दिया जाएगा। यदि सम्मित तकनीकी प्रकृति की हुई विषय समिति के अध्यक्ष के परामर्श से अथवा उनकी इच्छा पर आगे की कार्यवाही के लिए विषय समिति को भेजे जाने के बाद प्रलेख को अंतिम रूप दे दिया जाएगा ।

यह प्रलेख भारतीय मानक ब्यूरो की वैबसाइट www.bis.gov.in पर भी उपलब्ध हैं।

धन्यवाद ।

भवदीय,

(**दिव्या एस.**)
सदस्य सचिव सीईडी 44
वैज्ञानिक 'डी'(सिविल इंजीनियरिंग)
ई-मेल: divya.s@bis.gov.in

संलग्नः उपरलिखित

भारतीय मानक ब्यूरो
BUREAU OF INDIAN STANDARDS
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG, NEW DELHI 110002

WIDE CIRCULATION DRAFT

07 October 2024

Our Ref: CED 44/T-5

TECHNICAL COMMITTEE: Method of Measurement of Works of Civil Engineering (Excluding Water Resources Development) Sectional Committee, CED 44

ADDRESSED TO:

a) All Members of Civil Engineering Division Council, CEDC
b) All Members of CED 44 and its Subcommittees
c) All others interested

Dear Sir/Madam,

Please find enclosed the following document:

Doc No.	*Title*
CED 44 (26226)WC	**Method of Measurement of Building and Civil Engineering Works Part 5 Formwork** [(*Fifth Revision*) of IS 1200 (Part 5)] ICS 17.020; 91.040.01; 93.010

Kindly examine the draft standard and forward your views stating any difficulties which you are likely to experience in your business or profession, if this is finally adopted as National Standard.

Last Date for comments: **06 November 2024**

Comments if any, may please be made in the enclosed format and mailed to the undersigned at the above address or preferably through e-mail to **divya.s@bis.gov.in**.

In case no comments are received or comments received are of editorial nature, you will kindly permit us to presume your approval for the above document as finalized. However, in case of comments of technical in nature are received then it may be finalized either in consultation with the Chairman, Sectional Committee or referred to the Sectional Committee for further necessary action if so desired by the Chairman, Sectional Committee.

The document is also hosted on BIS website www.bis.gov.in.

Thanking you,

Yours faithfully,

(**Divya S.**)
Member Secretary CED 44
Scientist 'D' (Civil Engineering)
E-mail: **divya.s@bis.gov.in**

Encl: As above

FORMAT FOR SENDING COMMENTS ON BIS DOCUMENTS

(Please use A-4 size sheet of paper only and type within fields indicated. Comments on each clause/sub-clause/table/fig etc. be started on a fresh box. Information in column 3 should include reasons for the comments and suggestions for modified working of the clauses when the existing text is found not acceptable. Adherence to this format facilitates Secretariat's work) {Please e-mail your comments to **divya.s@bis.gov.in**

Doc. No.: **CED 44 (26226)WC**

Title: Method of Measurement of Building and Civil Engineering Works Part 5 Formwork [(*Fifth Revision*) of IS 1200 (Part 5)]
ICS 17.020; 91.040.01; 93.010

LAST DATE OF COMMENT: **06 November 2024**

NAME OF THE COMMENTATOR/ ORGANIZATION:_____

Clause/ Para/ Table/ Figure No. commented	Comments/Modified Wordings	Justification of Proposed Change

NOTE - Kindly insert more rows as necessary for each clause/table, etc

BUREAU OF INDIAN STANDARDS

DRAFT FOR COMMENTS ONLY

Draft Indian Standard

METHOD OF MEASUREMENT OF BUILDING AND CIVIL ENGINEERING WORKS PART 5 FORMWORK

[(*Fifth Revision*) of IS 1200 (Part 5)]

ICS 17.020; 91.040.01; 93.010

Method of Measurement of Works of Civil Engineering Sectional Committee, CED 44

Last date of comments **06 November 2024**

FOREWORD

(*Formal Clause will be added later.*)

Measurement occupies a very important place in the planning and execution of any civil engineering work from the time of first estimates to the final completion and settlement of payments for a project. Methods followed for measurement are not uniform and considerable differences exist between practices followed by different construction agencies and between various Central and State Government departments. While it is recognized that each system of measurement has to be specifically related to administrative and financial organizations within a department responsible for the work, a unification of various systems at technical level has been accepted as very desirable, especially as it permits a wider range of operation for civil engineering contractors and eliminates ambiguities and misunderstandings of various systems followed.

Among various civil engineering items, measurement of buildings was the first to be taken up for standardization and this standard having provisions relating to building work was first published in 1958 and then revised in1964, 1972, 1982 and 2013.

Since various trades are not related to one another, the Sectional Committee decided that each type of trade as given in IS 1200:1964 ‘Method of measurement of building works (*first revision*)’ be issued separately as different parts which will be helpful to specific users in various trades. This part of IS 1200 covering formwork as first issued in 1972 and revised further in 1982.

This fourth revision of the standard has been brought out to incorporate the changes found necessary in light of usage of this standard and suggestions made by various implementing bodies. The significant modifications in this revision are:

a) Amendment no 1 has been incorporated.
b) Provision to separately measure the work where underground utilities are present has been included;
c) Aluminium formwork has been included;
d) The provision to separately classify and measure the formwork of a single floor which exceeds 3.5m has been included;
e) The provision to separately classify and measure the formwork of cooling towers and silos has been included; and
f) Jump shutters have been included.

For standards on method of measurement of river valley projects, the Indian Standards formulated by the Measurement and Cost Analysis of Works for River Valley Projects Sectional Committee, WRD 23 under the Water Resources Division Council of BIS may be referred.

This standard contributes to the Sustainable Development Goal 9 ‘Build resilient infrastructure, promote sustainable industrialization and foster innovation’.

For the purpose of deciding whether a particular requirement of this standard is complied with the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS 2 : 2022 ‘Rules for rounding off numerical values (*second revision*)’. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

Preliminary Draft Indian Standard

METHOD OF MEASUREMENT OF BUILDING AND CIVIL ENGINEERING WORKS PART 5 FORMWORK

[*Fifth Revision* of IS 1200 (Part 5)]

1 SCOPE

This standard (Part 5) covers the method of measurement of formwork, where it is required to be measured separately.

2 GENERAL RULES

2.1 Clubbing of Items

Items may be clubbed together provided these are on the basis of the detailed description of items stated in this standard.

2.2 Booking of Dimensions

In booking dimensions, the order shall be consistent and generally in the sequence of length, breadth or width and height or depth or thickness.

2.3 Description of Items

The description of each item shall, unless otherwise stated, be held to include where necessary, conveyance and delivery, handling, loading, unloading, storing, fabrication, hoisting, lowering, all labour for finishing to required shape and size, and levels of striking and removal.

2.4 Measurements

All works shall be measured net in decimal system, as fixed in its place as given in **2.4.1 and 2.4.2.**

2.4.1 Dimensions shall be measured to the nearest 0.01 m.

2.4.2 Areas shall be worked out to the nearest 0.01 m^2.

2.5 Work to be Measured Separately

Work executed in the following conditions shall be measured separately:

a) Work in or under water,
b) Work in liquid mud,
c) Work in or under foul positions,
d) Work where underground utilities are present, and
e) Work interrupted by tides.

2.5.1 The levels of high and low water tides, where occurring, shall be stated.

2.5.2 Where springs requiring pumping are likely to be encountered, the work shall be measured against a separate specific provision made for the purpose (*see* **2.5.3**).

2.5.3 Special pumping, where resorted to, shall be measured separately including intermediate stages, unless stated otherwise, in kilowatt hours or HP hours, against specific provision made for the purpose.

2.6 Bills of Quantities

The bills of quantities shall fully describe the materials and workmanship, and accurately represent the work to be executed.

2.7 Measurement of Stages

Work shall be measured under the following categories in convenient stages stating the height or depth:

a) Below ground/datum level, and
b) Above ground/datum level.

NOTE –The ground/datum level shall be specified in each case.

3 DESCRIPTION OF FORMWORK

The formwork shall include the following**:**

a) Splayed edges, notchings, allowance for overlaps and passings at angles, sheathing battens, strutting, bolting, nailing, wedging, easing, striking and removal;

b) All supports, struts, braces, wedges as well as mud sills, piles or other suitable arrangements to support the formwork;

c) Bolts, wire ties, clamps, spreaders, nails or any other items to hold the sheathing together;

d) Working scaffolds, ladder, gangways, and similar items;

e) Filleting to form stop-chamfered edges or splayed external angles not exceeding 20 mm wide to beams, columns and the like;

f) If required, temporary openings in the forms for pouring concrete, inserting vibrators, and cleaning holes for removing rubbish from the interior of the sheathing before pouring concrete;

g) Dressing with oil to prevent adhesion; and

h) Raking or circular cutting.

4 TYPE OF FORMWORK

Separate items shall be provided for formwork with type of contact surface, such as**:**

a) wrought formwork (that is, sheathing having planed surfaces or sawn timber);

b) sheathing formed from tongued and grooved boards;

c) sheathing having plywood lining;

d) sheathing having special lining or any other arrangement to give extra smooth finish or texture or decorative surface for architectural concrete;

e) sheathing of steel sheeting, tubing or other varieties;

f) slip form technique extrusion process; and
g) aluminium formwork.

5 CLASSIFICATION

Formwork shall be generally classified as follows and measured separately, unless specified otherwise

a) Foundation, footings, bases of columns, etc; and mass concrete;

b) Flat surfaces, such as, soffits of floors, roofs landing and the like; where floors exceed 200 mm in thickness the formwork shall be measured separately stating the thickness;

c) Single floor which exceeds 3.5m span;

d) Vertical surfaces, such as, walls, partitions and the like, including attached pilasters, buttresses, plinth and string courses and the like, etc;

e) Sloping or battering surfaces, including folded plates:

1) Where inclination to horizontal plane does not exceed 30° (requiring shuttering only on the underside);

2) Where inclination to horizontal plane exceeds 30° (where shuttering may beprovided both on underside and upper side, if required) (only underside area to
be measured);

f) Arches:

1) up to 6 m span, and

2) above 6 m span;

g) Cylindrical shells (area of underside to be measured):

1) radius less than 3m, and
2) radius above 3m;

h) Waffle or ribbed slabs where shuttering is required for bottom inclined surface;

j) Dormer vaults, domes and shell roofs having curved surfaces in both directions (only the area of underside shall be measured);

k) Sides and soffits of beams, beam haunchings, cantilevers, girders, bressumers and lintels; beams and girders 1m deep and over shall be measured separately;

m) Sides of columns, piers, pillars, posts and stanchions and struts (square/rectangular/polygonal/circular/curved to be measured separately);

n) Edges of slabs and breaks in floors and walls (to be measured in running metres where under 200 mm width or thickness);

p) Cornices and mouldings;

q) Small surfaces, such as, cantilever ends, brackets and ends of steps, caps and bases to pilasters and columns and the like;

r) *Chullah* hoods, weather shades, *Chhajjas*, corbels, etc, including edges;

s) Staircases with sloping or stepped soffits, including risers and stringers, excluding landing;

t) Spiral staircases;

u) Chimneys, shafts, cooling towers and silos ;

w) Elevated water reservoirs;

y) Well steining;

z) Fins; and

aa) Slip forms/jump shutters.

6 METHOD OF MEASUREMENT

6.1 Formwork shall be measured, in square metres, as the actual surfaces in contact with the concrete or any other material requiring formwork. Formwork to small features, such as, in **5** (s) shall be enumerated. Formwork 'left in' shall be so described.

6.2 Formwork to secondary beams shall be measured up to the sides of main beams, but no deduction shall be made from the formwork of the main beam where the secondary beam intersects it. Formwork to beam shall be measured up to sides of column, but no deduction shall be made from the formwork to stanchion or column casings at intersections of beam.

6.3 Where formwork is required to be lined with wallboard, hardboard, polyethylene sheet or paper lining or to be coated with mould liquid or lime white, such formwork shall be so described and measured separately.

6.4 Where lining of wallboard, asbestos, cork slab and the like is of a permanent character and is to be left in, such lining shall be measured separately; the description shall include any necessary fixing to the concrete.

6.5 No deduction shall be made for each of opening up to 0.4 m^2. No deduction shall be made for any opening/cutouts when slip form technique is used. In case slip form technique is used, the formwork provided as stoppers to the openings/cutouts shall be measured separately as conventional formwork; and no deduction shall be made for any opening/cutout.

6.6 Raking or circular cutting and rounded or moulded edges shall be measured in running metres. Moulded stoppings shall be enumerated.

6.7 Jack rods (bread bar) used in slip forming, if required to be left in position in the concrete shall be measured separately by weight.

6.8 The measurements of formwork shall be made accurate to one centimeter.